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(64) Identification card and method of making same.

(57) A high security identification card is produced in a system in which a photograph from a video camera is converted to digital data and reproduced with high-fidelity on a video display screen. Other images, such as signatures and fingerprints, can be treated in a similar manner using either a video camera or a CCD (charge-coupled device). After processing, the video information is displayed on the screen where it is combined with variable data typed in from a keyboard. The digital data from the terminal is fed into a laser printer that prints the portrait and any desired alphanumeric information on a paper sheet. The paper is then laminated, under heat and pressure, between two sheets of transparent thermoplastic material, at a temperature and pressure sufficient to cause the plastic material to penetrate the interstices between the fibers of the paper card and form a unitary structure that cannot be delaminated without destruction of the identifying data. The digital information is stored in a permanent memory to allow the card to be reproduced later, with or without modifications.

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Identification Card and Method of Making Same

This invention relates to identification cards and more particularly to an identification card having a layer of paper, carrying pertinent identification information embedded between two layers of protective plastic, and to the method of producing such a card.

According to the prior art identification cards provide a quick and convenient means of providing personal identification. Such cards are widely used in connection with business transactions, control of access to restricted informations or areas, and for various governmental identification functions. Many such cards carry a magnetized stripe encoded with the identification information or may have one or more photographs usually require the use of photographic film with its attendant processing costs. Such cards can represent a major expense in high volume applications such as national identity cards.

U.S. Patent 3,640,009 to Komiyama describes an identification card in which a protective plastic layer is provided with a recess in which a paper insert carrying identification information is secured by adhesive. The edge portion of this plastic layer is laminated around its edges to another protective plastic sheet. The plastic used forms a filter that is transparent to either ultraviolet or infrared wavelengths which prevent the photographic image from being examined with ambient light. The construction described in Komiyama is expensive and is not suitable for high volume applications. An additional drawback is the requirement for specialized equipment to read the identification card.

U.S. Patent 3,245,697 to Nugent describes an identification card carrying a photograph and other indicia which makes use of a photographic film as one of two plastic protective layers which enclose an information layer having opaque and transparent areas in the form of an intricate scroll. The card is read by ultraviolet light that is transmitted through the card. This card has all of the disadvantages of the one described in Komiyama.

U.S. Patent 4,119,381, to Greenaway describes an identification card in which an internal information layer carries holograms, diffraction screens or miniature Fresnel prisms. That patent also discloses the use of a cellular structure for the information layer that prevents destruction of the information when the card layers are secured by chemical adhesives.

All of these identifications cards suffer from the high cost of production and their lack of suitability for high-volume low-cost application requiring maximum security.

The present invention is incorporated in a high volume card production system in which a photograph from a video camera is converted to digital data and processed to permit reproduction of a high-quality portrait on a video display screen. Other images, such as signatures and finger prints, can be treated in a similar manner using either a video camera or a CCD (charge-coupled device). After processing, the video information is displayed on the screen where it is combined with variable data typed in from a keyboard, or provided from another source. The video images can be cropped, reduced or enlarged, and moved to any desired location on the video screen. The digital data from the terminal is fed into a laser printer that prints the portrait and any desired alphanumeric information on a paper card. This card is then laminated, under heat and pressure, between two sheets of transparent thermoplastic material, at a temperature and pressure sufficient to cause the plastic material to penetrate the interstices between the fibers of the paper card and form a unitary structure that cannot be delaminated without destruction of the identifying data.

A brief description of the drawings and a description of preferred embodiment as follows:

Figure 1 is a diagrammatic representation of the elements of a system for making a high-security identification card in accordance with the present invention;

Figure 2 is a plan view of a card fabricated by the system represented by Figure 1; and

Figure 3 is an enlarged cross section of a portion of the card shown in Figure 2.

The portrait of a person 2 or other object to be reproduced on a high-security identification card 4 is recorded by a conventional video camera 6 and the corresponding signal fed into an image processor 8. The processor 8 modifies the information from the camera 6 in such manner as to permit the presentation of a high quality reproduction on the screen 12 of a video display terminal 14. The portrait is represented by digital information in a manner representing a half-tone image, but formed in most cases by various sizes and shapes of image particles rather than half-tone dots of varying intensity. Software for providing such digitized images are already known and are produced by a number of companies including Interleaf Inc. of Cambridge, Massachusetts.

Alternatively, the image may be produced by a scanning CCD 16 and may include a personal signature, finger prints or other information. This information is processed also by the image processor 8 and fed into the display terminal 14. The



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EUROPEAN SEARCH REPORT

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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.4)
X	FR-A-2 449 930 (GAO GESELLSCHAFT FÜR AUTOMATION UND ORGANISATION mbH) * Page 7, line 33 - page 13, line 4; figures *	1, 4, 5, 9	B 42 D 15/02
Y		2, 3, 6- 8	
Y	FR-A-2 266 245 (GAO GESELLSCHAFT FÜR AUTOMATION UND ORGANISATION mbH) * Page 3, line 32 - page 7, line 1; figures *	2, 3, 6- 8	
A	EP-A-0 113 228 (McCORMACQUODALE PLC) * Page 19, line 1 - page 20, line 8; figure 4 *	1, 5	TECHNICAL FIELDS SEARCHED (Int. Cl.4)
A	WO-A-8 204 149 (HARRISON & SONS LTD)		B 42 D G 06 K
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 15-04-1987	Examiner LONCKE J.W.
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons Δ : member of the same patent family, corresponding document	

display terminal is provided with known controls to crop, reduce or enlarge the visual images and place them in any desired position on the screen 14.

Additional data to be included on the card 4 is typed into the display terminal from a conventional Keyboard 18. When the information is displayed in the desired format on the screen 12, the signal from the terminal is fed into a laser printer 22 which reproduces the image on a paper sheet 24. The printer may be similar to those manufactured by Cannon, Inc. and preferably is capable of producing sheets large enough to hold a number of individual bodies of card information. For example, a single sheet of paper can be printed on both sides, in a single pass, with the information for as many as thirty identification cards. Line art can be printed with a resolution of 150 pairs per inch (2,5 cm). Photographic information is printed with a resolution of 100 pixels per inch (2,5 cm) with 64 levels of gray. The digital information is also fed into a permanent memory 25 which permits the information to be recalled at a later time for modification or producing an additional identical card.

The printed sheet of paper is fed into a laminator 26 where the paper sheet is laminated under heat and pressure between two sheets 28 and 32 of transparent thermoplastic material, such as polyester. The pressure and heat are adjusted to melt the plastic sufficiently to cause it to penetrate the fibers of the paper, as indicated by the jagged lines "a" and "b" in Figure 3. The lamination, including a number of individual identification cards, is passed through a cooling chamber 34 into a card puncher 36. The puncher punches the individual cards 4 from the larger sheet.

As illustrated by Figure 2, the finished card may include a portrait, a personal signature and printed data. As mentioned above, the card may be printed on both sides to provide additional information. If the card is printed on one side only, then only one sheet of the plastic laminate need be transparent.

The high cost of instant-type photographic film and the cumbersome photographic processes are eliminated by the direct imaging process described here. The resulting card is economical to produce, since it eliminates all requirements for film, yet provides a highly secure identification card that is substantially impossible to alter. Any attempt to delaminate the card results in destruction of the information carried by the card. The system is flexible and any card in the system can be readily produced again, either in modified or identical form, by recalling from the memory 25 the digital information representing the card.

Additional security can be provided by using bank note paper with preprinted fine line coded patterns, such as that sold under the trademark Scrambled Indicia, by Graphic Security Systems Corporation, 505 Northern Boulevard, Great Neck, New York. Further security can be provided by the use of ultraviolet fluorescent or water soluble inks, water marks, or holograms

Claims

1. The method of fabricating an identification card comprising the steps of
recording an identification image in the form of a first set of digital data,

processing said first set of data to produce a visible reproduction of said image,
providing a second set of digital data representing additional identification information,
printing a visual pattern controlled by said sets of data on a sheet of paper, and
laminating said paper between two sheets of thermoplastic material, at least one of which is transparent to visible light, with sufficient heat and pressure to cause said plastic to penetrate interstices between the fibers of said paper.

2. The method as claimed in Claim 1 wherein said plastic is formed of polyester.

3. The method as claimed in Claim 1 wherein both sheets of said plastic material are transparent to visible light.

4. The method as claimed in Claim 1 wherein said step of printing said information on a sheet of paper includes the step of printing by means of a laser printer.

5. The method as claimed in Claim 1 including the additional steps of
presenting both of said sets of data on a video terminal screen,
rearranging the format of said data, and
recording both of said sets of data in a permanent memory.

6. An identification card comprising
first and second sheets of thermoplastic material, at least one of which is transparent to visible light, and
a sheet of paper carrying identification information laminated between said sheets of plastic, the plastic material being embedded into the fibers of the paper such that the card cannot be delaminated without destroying the identification information.

7. An identification card as claimed in Claim 6 wherein
both of said plastic sheets are transparent to visible light.

8. An identification card as claimed in Claim 6
wherein
said plastic sheets are formed of polyester.

9. An identification card as claimed in claim 8
wherein
said identification information includes a personal
photograph printed on said sheet of paper.

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